On the generic characters of the ancillary appendages of the Plebeiid section of the Lycænids (*with plate*).

By T. A. CHAPMAN, M.D., F.E.S.

In *A Natural History of the British Lepidoptera*, vol. x., pp. 155 *et seq.*, are some remarks on the male appendages of Plebeiids. I have since arrived at some conclusions of importance in this matter, although they leave many points still to be co-ordinated.

The form of the clasps and dorsal processes define the group very distinctly from any other, but are also very slightly different in different species, yet almost always sufficiently to afford specific characters. But their failure to afford characters to define genera is remarkable, in view of their affording such good tribal and specific characters. This failure is noted specially (*loc. cit.*) in the case of the genus *Plebeius*. In regard to the other genera there referred to, the characters are also rather too indefinite, so much so that they made me very sceptical as to the value of the genera accepted by Mr. Tutt, especially as he gives no definitions of them except by saying what species he puts in them. Nevertheless, besides recognising the groupings so made to have each a somewhat distinctive facies, I had much confidence in Mr. Tutt's instinctive power of recognising generic groups in a case like this. It is, therefore, with some pleasure that I find a character of the appendages that defines several of these genera more exactly than any other yet suggested, and does so fairly in accord with Mr. Tutt's divisions. The ædœagus affords a very distinct form in several of the genera. Especially, for example, it separates *Agriades* (*coridon*) from *Polyommatus* (*icarus*), two genera for which no differentiating characters had been proposed.

Agriades has perhaps the most easily recognised form of ædœagus, well seen in vol. x., pl. xxi., fig. 4, a straight shaft, with a contracted neck at the base, but most characteristically a bulbous swelling at the top. Here it is necessary to define a point in the connections of the ædœagus; this is its attachment to the floor of the genital cavity, through which it passes. The ædœagus has this membrane attached to it at a particular zone or circle. In *Agriades* this zone is on the bulbous swelling near its lower margin, and the portion of the organ above the membrane is merely the upper part of the bulb and a small projection beyond. *Polyommatus* (*icarus*) agrees with *Agriades* in having a comparatively small portion beyond the zone of attachment, but this portion is in fact a shade longer, and differs *in toto*, in tapering from the zone onwards, and having no trace of a bulb. This portion is also of much slighter texture than the bulb in *Agriades*, which is a dense and highly chitinised structure.

Aricia (*astrarche*) has a highly characteristic structure, very different from the two we have been considering. In this, the portion beyond the zone is much prolonged. It may be noted that, throughout the Plebeiids, the portion of the ædœagus within the zone does not vary much in length in the different species, generally about 0·65mm. in length, it varies in different species to 0·55mm. to 0·8mm., rarely outside these limits. The portion beyond the zone varies much more widely—in *Agriades* about 0·22mm., in *Aricia* (*astrarche*) it is nearly 0·8mm., longer than the basal portion. It tapers gradually to a point, and appears to have a long lateral opening instead of the nearly

terminal one in the shorter examples. One inclines to suggest here the question whether this lengthened ædœagus implies any relationship with the Theclids, which one would not perhaps do but for the resemblance to the latter in the dark colour of the upperside of the wings in both sexes, again indicating Theclid affinities. *Anteros* and *isaurica* have a very similar ædœagus; one doubts whether they belong to *Aricia*, however, but require a separate generic position.

Plebeius is not altogether dissimilar to *Aricia* in having the external portion prolonged, but not so much so as in *Aricia*. The ædœagus is broader and stouter, and the outer portion tapers more rapidly, and more evidently shows an opening (for the exsertion of the eversible membrane) extending along nearly the whole side of the external portion. It is here that one finds the ædœagus giving a note more in accordance with our notions of the genus than the other portions of the appendages. These would place *argus* (*aegon*) and *argyrognomon* in separate genera, but the ædœagus places them together; it also separates from *Aricia* certain species whose claim to belong to that genus consists in little beyond having comb-like teeth to the clasps something like those of *argus* (*aegon*).

Another very definite form of ædœagus is found in Tutt's genera *Cyaniris* (*semiargus*), *Albulina* (*pheretes*), and *Latiorina* (*orbitulus*). In these forms the general aspect is not unlike that in *Polyommatus* (*icarus*), but the extremity has a special structure; on its dorsal side it has a process bent into the lumen of the tube, that has on dorsal view a square end (see *orbitulus*), but on lateral view looks like a hook projecting inwards from the dorsal margin. It seems, however, to be a thickening of the wall of the tube possibly straightened outward when the eversible membrane is exserted.

Vacciniina (*optilete*) does not agree with any of the other genera very closely. It has a broad straight tube suddenly tapering at the zone.

There are some doubtful species, for example, *eurypilus* seems to be a *Plebeius*, but the ædœagus is very short, and extremely so beyond the zone; *alcedo* and *lucifera* seem to belong to a separate genus having unusually short and broad ædœagi.

Chilades has the ædœagus very like that of *Aricia*, but the clasps here mark it off distinctly, the serrated end being on a comparatively long neck. It may be noted that *cnejus* has nothing to do with *Catachrysops*, but it is a Plebeiid belonging, or close to, *Chilades*.

Referring to the examples of each genus given on page 154 (vol. x.), this classification by the structure of the ædœagus alters the position of some of the species. *Psylorita* is not an *Aricia*, but is much closer to, if not actually in, *Polyommatus*: *persephatta* is not a *Cyaniris*, but a *Plebeius*: *escheri* is not a *Polyommatus*, but an *Agriades*: *Hirsutina* is indistinguishable from *Agriades*: *meleager* is a *Polyommatus*.

So far as my examination has gone, the great mass of Plebeiids belong to the genus *Agriades*. It includes the following forms, of which I have not verified the correct naming of all examples, but I believe there are few, if any, errors—*actis*, *amanda*, *aegagrus*, *armena*, *athis*, *celestina*, *daymara*, *dama*, *damon*, *damone*, *eroides*, *erschoffi*, *escheri*, *glaucias*, *hoppfferi*, *hylas*, *iphigenia*, *mesopotamica*, *mithridatis*, *phyllides*, *phyllis*, *poseidon*, *posthumus*, *superba*.

Under *Polyommatus* come *amor*, *candalus*, *celina* (not=*icarus*), *eros*,

hunza, *martini*, *meleager*, *psylorita*, *sarta*, *venus*, and especially *icarus*, with its many forms *ariana*, *persica*, *icadius*, etc., and one or two other forms whose names I have not ascertained—*rutilus* and *hyrcana* appear to belong here rather than to *Plebeius*.

Plebeius has *argus*, *argyrognomon*, *zephyrus*, *cleobis*, *pheres*, *aemon*, *melissa*, *persephatta*, *aster* (?), *pylaon*, *eversmanni*, *lorcii*.

To *Aricia* I find no species unquestionably to belong except *astrarche*, *eumedon*, *idas* and *donzelii*, but *isaurica*, *hyacinthus*, *fulla*, and *anteros*, may do so, or may require a separate division or divisions. To *Vacciniina* belong, as well as *optilete*, *fergana* and *torgouta*. As already noted, this is near to *Cyaniris*, which has *semiargus*, and to *Latiorina*, with *orbitulus* and *pyrenaica*, and *Albulina* with *pheretes*. I much question whether these four groups are not congeneric.

I know little of the American forms, but of these some, such as *isophthalma*, are very remarkable in structure.

It may be noted that in some species the indications are not so crisp and decided as I appear to represent them, and that, for example, in *Plebeius* and *Aricia* I have chosen the most marked examples at hand. Further, I have worked with the actual specimens, *primâ facie* the correct way, but really more liable to error by inadvertence and confusion than by photographs, with the specimens to refer to in cases of doubt or difficulty only.

EXPLANATION OF PLATE V.

PLEBEIIDI.—CAMERA OUTLINES OF THE ÆDŒAGUS.—The transverse lines mark the "zone" or point at which the ædœagus passes through and takes attachment to the floor of the cavity.

1. *Plebeius argyrognomon*, nearly lateral view.
2. *Agriades thetis*, it is not usual for the "bulb" to have such a neck above, it usually declines gradually into the terminal portion, dorsal view.
3. *Polyommatus icarus*, dorsal view.
4. *Aricia astrarche*, dorsal view.
5. *Vacciniina optilete*, dorsal view.
6. *Cyaniris semiargus*, lateral view.
7. *Albulina pheretes*, semilateral view.
8. *Latiorina orbitulus*, dorsal view. Viewed in the same aspect, the hooked process is very similar in the three last species.

Observations on the Hybernation of Gonepteryx rhamni.

By J. F. BIRD.

Most of the hybernating butterflies, such as *Eugonia polychloros*, *Aglais urticae*, *Vanessa io*, etc., seek their winter-quarters, when the weather is still warm, in hollow trees, wood-stacks, lofts, sheds, and, *A. urticae* especially, in the attics and dark corners in dwelling-houses, and there remain until spring, safely protected from the perils of frost, snow, and winter storms. But *Gonepteryx rhamni* is evidently a less delicate species that requires no particular shelter, and probably passes through the winter clinging to a plant it sought only for its night's rest at the end of a fine day in autumn, but it happening that the subsequent days were cold, or else a spell of bad weather arriving, it just remained where it was until induced to fly once more on some sunny day in early spring. Twice have I found hybernating specimens of this butterfly, and both times remarked that they were in positions sheltered on the north and east from the bitterly cold winds which blow from those two quarters of the compass. Have other observers